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**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 17948.7-2025**

Replacing GB/T 17948.7-2016

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**Rotating electrical machines - Functional evaluation of  
insulation systems - General guidelines  
(English Translation)**

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## Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 7 of GB/T 17948. GB/T 17948 has published the following parts.

- Functional assessment of insulation structure of rotating electrical machines; Test procedures for random-wound windings; Thermal assessment and classification;
- Functional assessment of the insulation structure of rotating electrical machines; Randomly wound winding test procedures; Changes and classification of insulation component replacement;
- Functional assessment of insulation structures of rotating electrical machines. Test procedure for formed windings. Thermal assessment and classification of insulation structures of rotating electrical machines;
- Functional evaluation of insulation structure of rotating electrical machines (Type II) Test procedure for formed windings Electrical durability evaluation;
- Functional evaluation of insulation structure of rotating electrical machines; Test procedure for formed windings; Multi-factor evaluation of thermal and electrical comprehensive stress durability;

--- Functional evaluation of insulation structures of rotating electrical machines; Test procedures for formed windings; Evaluation of the thermomechanical durability of insulation structures;

--- General principles for functional assessment of insulation structures of rotating electrical machines.

This document replaces GB/T 17948.7-2016 "General principles for functional evaluation of insulation structures of rotating electrical machines" and is compatible with GB/T 17948.7-Compared with 2016, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

--- Changes and additions to terms and definitions (see Chapter 3, Chapter 3 of the 2016 edition);

--- Supplemented the conditions for functional assessment of various insulation structures (see 4.1, 4.1 of the 2016 edition);

--- Modified and added the assessment of minor changes in components, manufacturing processes or designs (see 4.4, 4.4 of the 2016 edition);

--- Supplemented the applicable conditions for special comparative tests for different expected life or stress parameters (see 4.5, 2016 edition 4.5);

--- Changed and added the requirements for insulation structure approval testing (see 4.6, 4.6 of the 2016 edition);

--- Changed the relevant requirements for thermal functional test analysis and reporting of insulation structures (see 5.2, 5.2 of the 2016 edition);

--- Changed the requirements for description, analysis and reporting of electrical functional tests of insulation structures (see Chapter 6, 2016 edition Chapter 6);

--- Changed and added the principles of multi-factor functional testing of insulation structures (see Chapter 9, Chapter 9 of the 2016 edition).

This document is equivalent to IEC 60034-18-1:2022 "Rotating electrical machines - Part 18-1.General principles for functional assessment of insulation structures".

The following minimal editorial changes were made to this document.

--- In order to coordinate with the existing standards, the name of the standard is changed to "General principles for functional evaluation of insulation structures of rotating electrical machines".

## Introduction

The various parts of IEC 60034-18 specify the functional assessment and special test procedures for different types of insulation structures of rotating electrical machines.

IEC 60034-18-1 specifies the general principles of these procedures and identification rules, while IEC 60034-18-21, IEC 60034-18-31, IEC 60034-IEC 60034-18-32, IEC 60034-18-33, IEC 60034-18-34, IEC 60034-18-41 and IEC 60034-18-42 give the specifications for different types of windings.

In addition, IEC 60034-18-41 and IEC/T S60034-18-42 emphasize the requirements for the windings powered by the inverter.

Specific test procedures to be included in the electrical evaluation.

The following documents provided the basis and background for the development of this document.

IEC 60505 provides the basis for the evaluation of aging of electrical insulation systems under conditions of electrical, thermal, mechanical, environmental stress or multiple stress factors.

It specifies the general principles and procedures to be followed in developing functional test and assessment procedures.

IEC 60216 specifies the test of thermal resistance of insulating materials. Assuming that the Arrhenius equation represents the thermal aging rate of the material, the test procedures and analysis instructions for obtaining characteristic parameters [such as temperature index (TI), half differential (HIC) and relative temperature index (RTE)] are specified.

The performance selection and acceptance endpoint criteria for all these parameters are discussed in detail. Therefore, due to the use of different performance tests and different endpoint criteria, a material A material may specify multiple temperature indices.

IEC 60034-18-1 specifies the general requirements for the identification of insulation structures. Based on many experiences, it is shown that for thermal aging, the Arrhenius formula the program may not be applicable.

IEC 60085 deals with the thermal assessment of electrical insulating materials, especially the thermal assessment of insulation systems used in electrical equipment.

The thermal classification of the insulation structure of rotating electrical machines within the scope of IEC 60034-1 is defined and expressed as 130 (B), 155 (F), 180 (H).

In the past, insulation construction materials were often selected based solely on the thermal resistance of the individual materials as per the IEC 60216 series of standards.

IEC 60085 states that such selection is only used to screen materials before further functional assessment of new insulation structures that have not been proven in operation.

For thermal evaluation of insulation structures, operating experience is preferred.

Base.

IEC 62539 specifies statistical methods for analyzing the breakdown time and breakdown voltage data of solid insulating materials, which are used to describe the structural performance and Comparison with other insulating structures. The analysis of the Weibull distribution is described, but other distributions are also proposed.

GB/T 17948 provides functional assessment and special test procedures for the insulation structure of rotating electrical machines and consists of 7 parts.

--- Functional evaluation of the insulation structure of rotating electrical machines, test procedures for random-wound windings, thermal evaluation and classification. The purpose is to specify the Test procedure for thermal assessment and classification of randomly wound winding insulation arrangements used or intended for use in d.c. rotating electrical machines.

--- Functional evaluation of the insulation structure of rotating electrical machines - Changes to the test procedures for random-wound windings and classification of insulation component replacements.

This test procedure is used to specify thermal assessment and classification test procedures for changes in the insulation structure of randomly wound windings and replacement of insulation components.

--- Functional evaluation of insulation structures of rotating electrical machines Test procedure for formed windings Thermal evaluation and classification of insulation structures of rotating electrical machines.

The purpose of this test is to specify the thermal resistance test of the insulation structure of AC or DC rotating electrical machines with indirect cooling and formed windings.

Procedures and classification, providing thermal aging methods and diagnostic test procedures.

--- Functional evaluation of the insulation structure of rotating electrical machines (Type II) Test procedure for formed windings Electrical durability evaluation.

This standard specifies the test procedure for evaluating the electrical durability of the insulation structure of a formed-winding rotating electrical machine supplied with a sinusoidal power frequency voltage.

--- Functional evaluation of insulation structure of rotating electrical machines. Test procedure for formed windings. Multi-factor evaluation of thermal and electrical comprehensive stress durability.

The purpose is to specify the insulation structure of the formed winding used or intended for AC motors to withstand thermal and electrical stress durability tests at the same time.

Assessment procedures at the time.